

Remarks

Claims 1, 11, 13, 14, 15, 16, 18 and 19 have been amended, and claims 1-19 remain in the application. Reexamination of the application as amended is respectfully requested.

Claim 1 is rejected under 35 U.S.C. §112, second paragraph, for reasons stated in the Office Action. Claim 1 has been amended to address the rejection; and Applicants submit that the rejection of claim 1 under 35 U.S.C. §112, second paragraph, should be withdrawn.

Claim 1 is rejected under 35 U.S.C. §102(b) as being anticipated by Mathias et al. (U.S. Patent No. 5,565,241). Mathias et al. relates to a spray coating apparatus having a spray nozzle 1 of Fig. 2 with a plurality of atomizing holes 6.

In contrast to Mathias et al., the invention of claim 1 relates to a jetting process described in paragraph 27 with respect to Fig. 2. The pulsed operation of the transducer 76 ports a pulse of pressurized air into the cylinder 43 and produces a rapid lifting of the piston 41. Lifting the piston lower rod 45 from the seat 49 draws viscous material in the chamber 47 to a location between the piston lower rod 45 and the seat 49. At the end of the output pulse, the transducer 76 returns to its original state, thereby releasing the pressurized air in the cylinder 43, and a return spring 46 rapidly lowers the piston lower rod 45 back against the seat 49. In that process a jet of viscous material is rapidly extruded or jetted through an opening or dispensing orifice 59 of a nozzle 48. As schematically shown in exaggerated form in Fig. 2, a very small viscous material droplet 37 breaks away as a result of its own forward momentum; and its forward momentum applies it to a surface 80 of the substrate 36 as a dot of viscous material on the substrate 36. Successive operations of the cylinder 43 provide respective droplets of material 37. As used herein, the terms "jetting" refers to the above-described process for forming the conformal coating material droplets 37. The dispenser 40 is capable of jetting droplets from the nozzle 48 at very high rates, for example, up to 100 or more droplets per second.

Claim 1 recites the above-described jetting process in which a valve closure element, a valve seat and a nozzle are operable as recited in claim 1 to produce and apply a droplet

of viscous material onto a substrate. Applicants submit that Mathias et al. does not disclose the method of operating a jetting valve as recited in claim 1; and therefore, Applicants submit that claim 1 is patentable and not anticipated 35 U.S.C. §102(b) by Mathias et al.

Claims 1-19 are rejected under 35 U.S.C. §103(a) as being unpatentable over Hynes et al. (U.S. Pat. No. 6,447,847) in view of Hogan et al. (U.S. Pat. No. 5,294,459). Hynes et al. relates to a system having a multi-axes positioning system that supports and moves multiple conformal coating applicators that may be moved to tilted orientations with respect to a substrate. The conformal coating is dispensed using a dispensing valve or a spray valve. As shown in Fig. 6 and described at col. 2, lines 56-63, spray valve 32 is a pneumatically actuated valve that combines conformal coating with pressurized air to dispense an atomized spray pattern, such as, for example, a round spray pattern. Dispensing valve 34, also referred to as a "needle valve," is also a pneumatically actuated valve, but flows conformal coating through an interchangeable needle orifice.

Hogan et al. relates to a coating system for applying a coating to printed circuit boards using either an atomized or nonatomized spray. The apparatus operates by pressurizing the conformal coating material, so that it is released as a spray upon opening a valve.

Applicants submit that there is no description or suggestion in either Hynes et al. or Hogan et al. of a jetting valve operation as is recited in independent claims 1, 11, 13, 14, 16, 18 and 19, in which a valve closure element is engaged with a valve seat to propel a flow of viscous material through the nozzle. The flow of viscous material being broken using its forward momentum to form a droplet of material that is applied to the substrate. Therefore, Applicants submit that Claims 1-19 are patentable and not obvious under 35 U.S.C. §103(a) over Hynes et al. in view of Hogan et al.

Applicants submit that the application is now in condition for allowance. The Examiner is invited to contact the undersigned in order to resolve any outstanding issues and expedite the allowance of this application.

Application No. 10/699,627
Amendment dated August 31, 2007
Reply to Office Action dated May 31, 2007

Applicant does not believe that any fees are due in connection with this submission. However, if such petition is due or any fees are necessary, the commissioner may consider this to be a request for such and charge any necessary fees to Deposit Account No. 23-3000.

Respectfully submitted,

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